

5.6. Due to the shallow depths that exist across the ebb tide delta, the only practical way to relocate the channel is with an ocean certified cutter-suction pipeline dredge. These dredges generally have a minimum digging depths of around 12 feet. Therefore, the minimum channel depth considered was 13.5 feet below NGVD (12.0 feet below MLW) with incremental depths of 15.5 feet NGVD and 17.5 feet NGVD also evaluated. The side slopes of the channel specified for construction will be 1 vertical to 5 horizontal (1V:5H), however, as discussed below, the ultimate side slopes that the new channel will assume will be much flatter. The nomenclature used to identify the 6 channel alternatives will be by its depth and maximum bottom width, i.e., 13.5-ft NGVD x 400 ft, 13.5-ft NGVD x 500 ft, 15.5-ft NGVD x 400 ft, 15.5-ft NGVD x 500 ft, 17.5-ft NGVD x 400 ft, and 17.5-ft x 500 ft. The estimated construction volumes for the 6 channel alternatives are as follows:

Construction Volumes for Channel Alternatives	
13.5-ft NGVD x 400 ft	906,100 cubic yards
13.5-ft NGVD x 500 ft	1,009,500 cubic yards
15.5-ft NGVD x 400 ft	1,076,500 cubic yards
15.5-ft NGVD x 500 ft	1,196,600 cubic yards
17.5-ft NGVD x 400 ft	1,254,400 cubic yards
17.5-ft NGVD x 500 ft	1,421,300 cubic yards

5.7. The repositioning of the inlet channel combined with the closure of the existing channel next to the Pointe, either by the deposition of littoral sediment or through direct placement of dredged material, will reduce or completely eliminate flows in the existing channel. The remnants of the existing channel will shoal and a new sand spit will develop off the west end of Emerald Isle. With a properly sized channel, the flow diverted from the existing channel will be funneled through the new channel and the flow areas across the ebb tide delta will adjust to areas comparable to the existing flow areas. The adjustments likely to occur following the construction of the new channel would include the flattening of the channel side slopes from 1V:5H to between 1V:20H and 1V:50H, or slopes comparable to those of the existing channel. In this regard, construction slopes flatter than 1V:5H are not practicable given the operational constraints associated with an ocean certified pipeline dredge. As mentioned previously, the minimum digging depth for these types of dredges is approximately 12 feet, therefore the dredge would not be able to mechanically produce a flat slope as this would require the dredge to remove material from bottom of the channel up to the top of the cut. The formation of a channel side slope during construction is generally the result of material sloughing as the dredge undercuts the bank. As a result of the post-construction adjustments, the new channel would assume the same characteristics as the existing bar channel

5.8. Changes in the cross-sectional area of the inlet that would be associated with the six channel alternatives were evaluated by measuring cross-sections of the inlet from near the confluence of the ebb channel with Eastern Channel seaward to the outer edge of the ebb tide delta. The locations of the cross-sections, which were spaced at 500-foot intervals along the centerline of the proposed channel, are shown on Figure 5.7. The cross-sections were constructed across the inlet along lines that were roughly perpendicular to

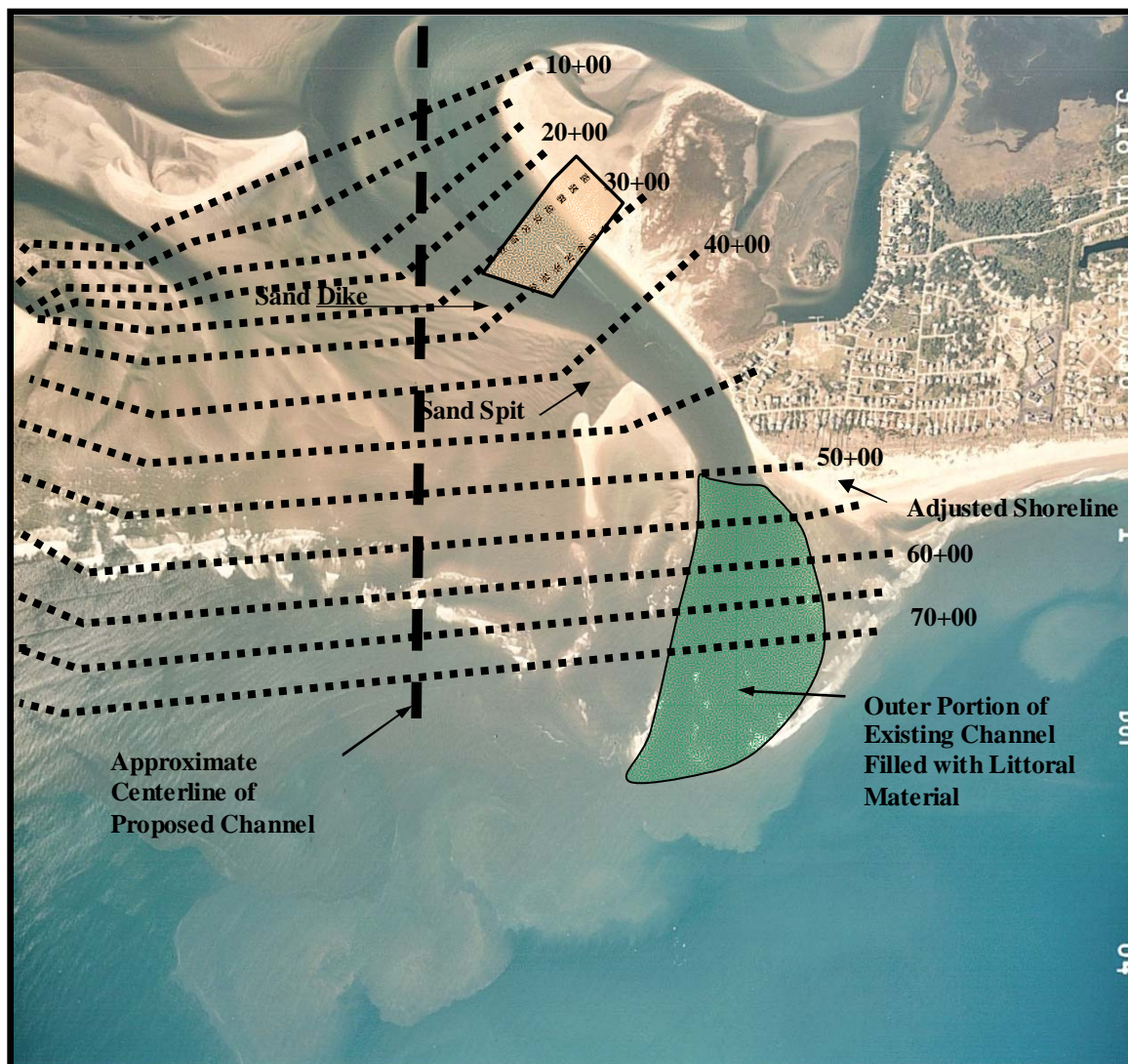


Figure 5.7 Cross-Section Locations and Adjusted Shoreline Conditions Following Channel Relocation

the primary direction of flow. As a result, the spacing of the cross-sections at points removed from the centerline of the proposed channel vary as shown on Figure 5.7. Also shown on Figure 5.7 is a hypothetical sand spit that is expected to form off the west end of Emerald Isle, the general location of a sand dike, and the seaward portions of the existing channel that would eventually shoal following the channel relocation.

5.9. Cross-sectional areas measured along each of the lines for the existing condition and with the six channel alternatives are summarized in Table 5.1(a) for the 400-foot maximum width and Table 5.1(b) for the 500-foot maximum width. Immediately following the construction of the channel, the cross-sectional areas measured along each of the lines will be larger than the existing area. Based on the discussion presented above, Bogue Inlet has achieved a balance between sedimentary forces trying to close it and hydraulic forces tending to keep it open. Accordingly, the excess area created by the relocated channel will eventually be reduced or eliminated as the inlet undergoes readjustments with the adjustments resulting in cross-sectional areas at each line